FIG. 1

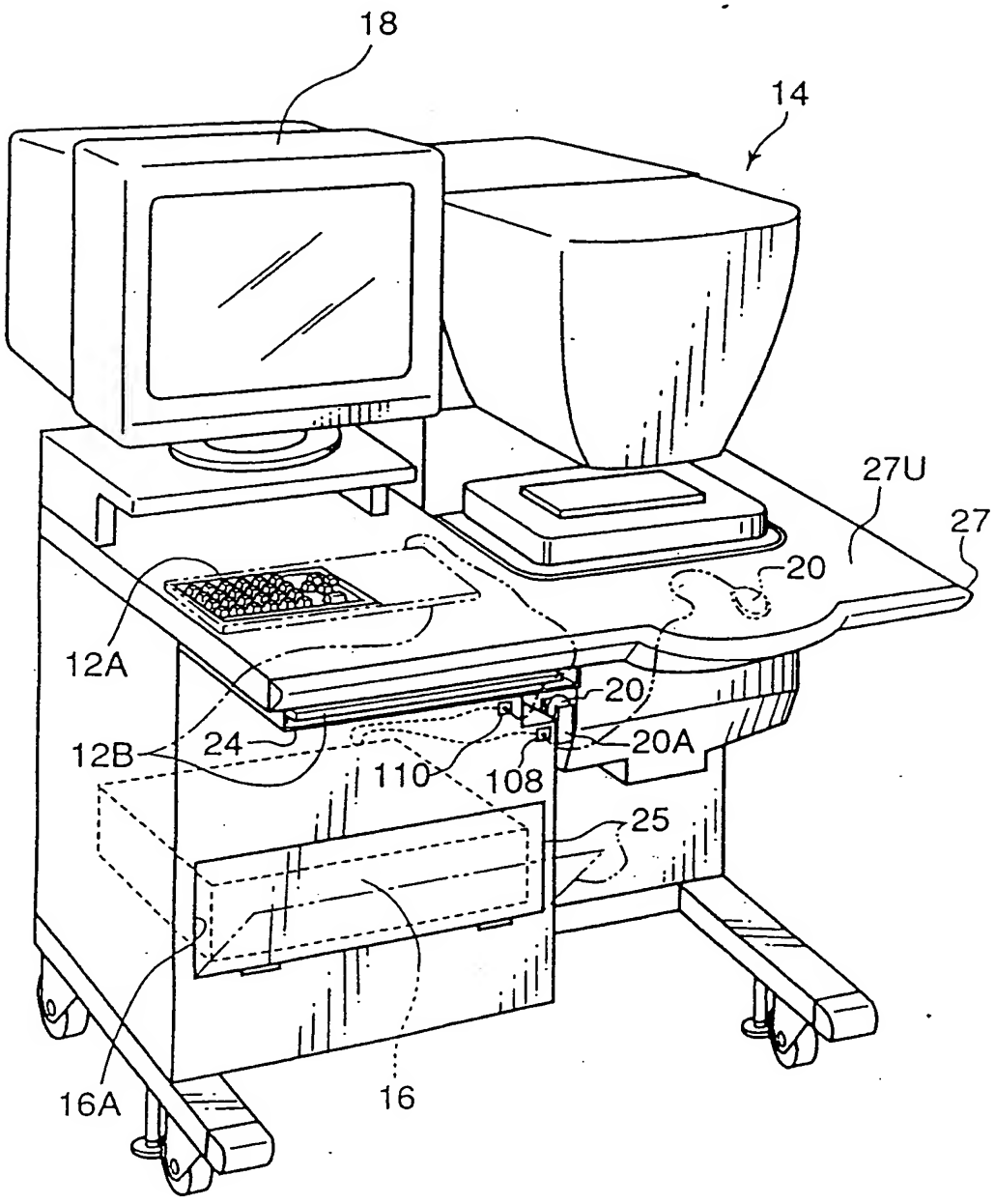


FIG. 2

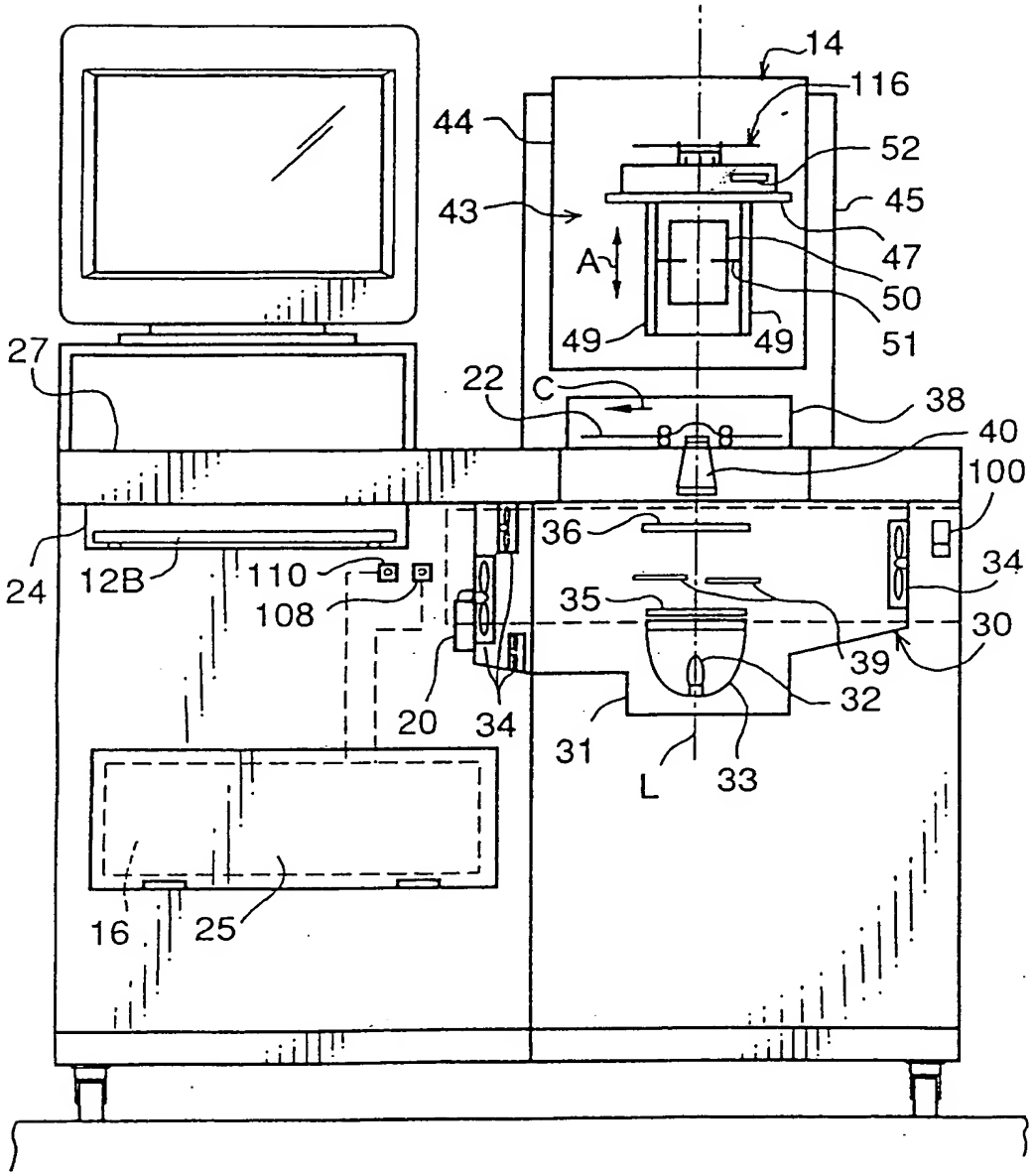

14
116
44
52
43
45
A
47
50
49
49
51
27
22
C
38
40
100
36
34
24
12B
110
108
35
30
39
32
20
34
31
33
L
16
25

FIG. 3

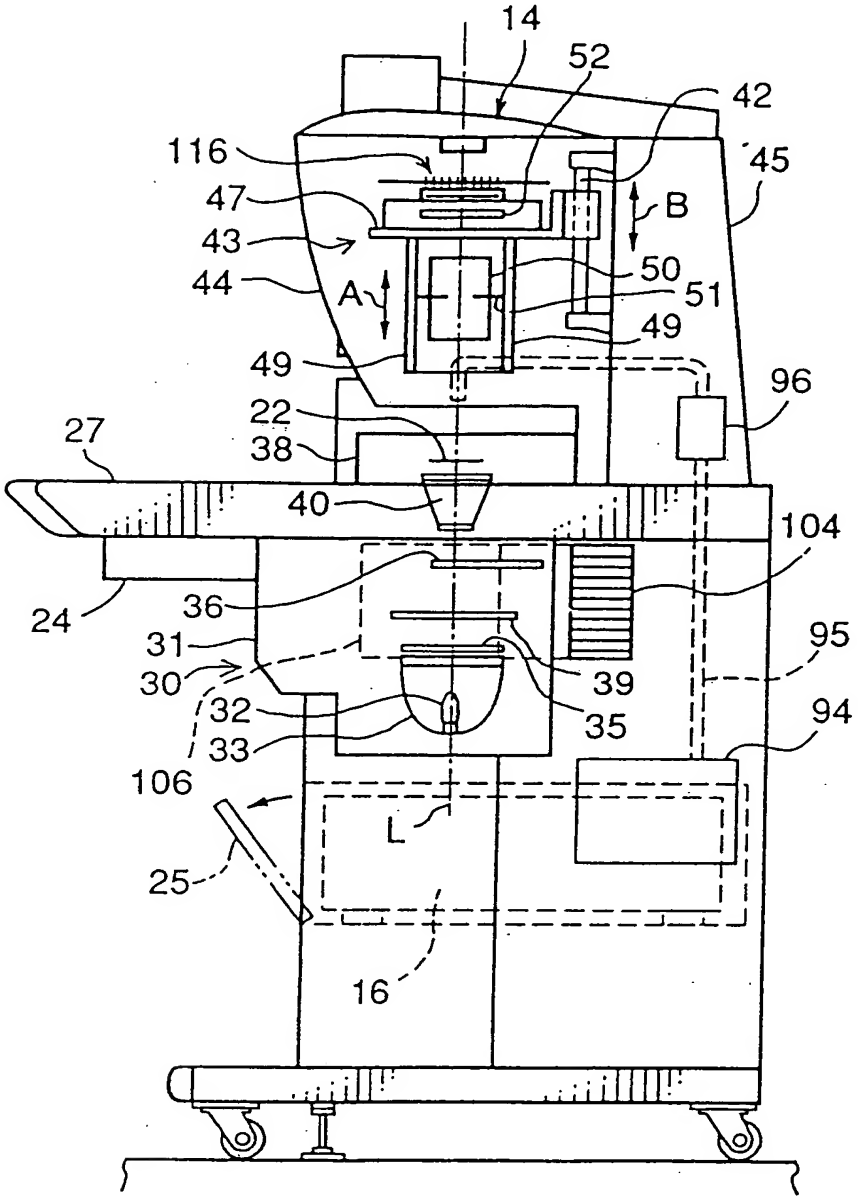

14
52
42
116
45
47
B
43
50
44
A
51
49
49
96
22
27
38
40
104
24
36
95
31
39
30
32
35
94
33
106
L
25
16

FIG. 4A

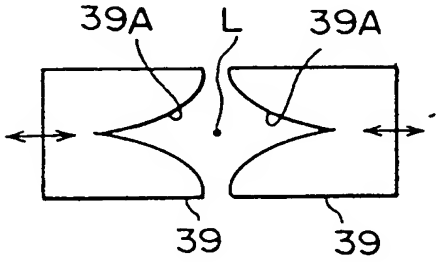


FIG. 4B

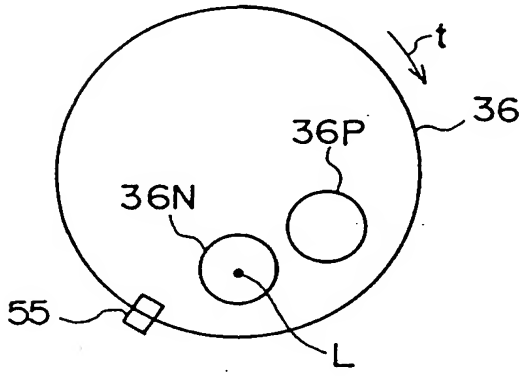


FIG. 4C

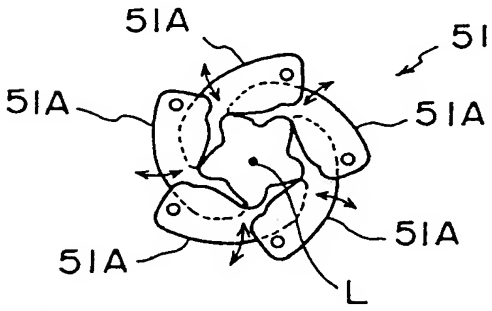


FIG. 4D

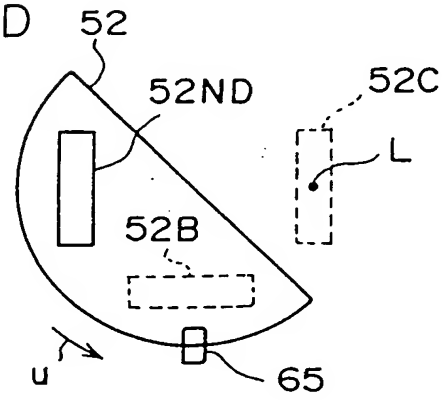


FIG. 5

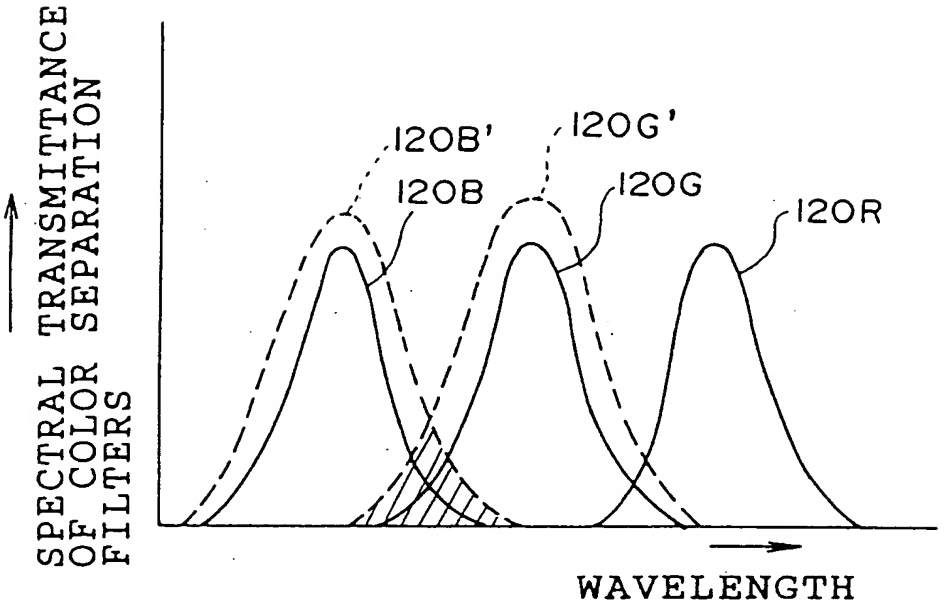

SPECTRAL TRANSMITTANCE OF COLOR SEPARATION FILTERS
120B'
120G'
120B
120G
120R
WAVELENGTH

FIG.6

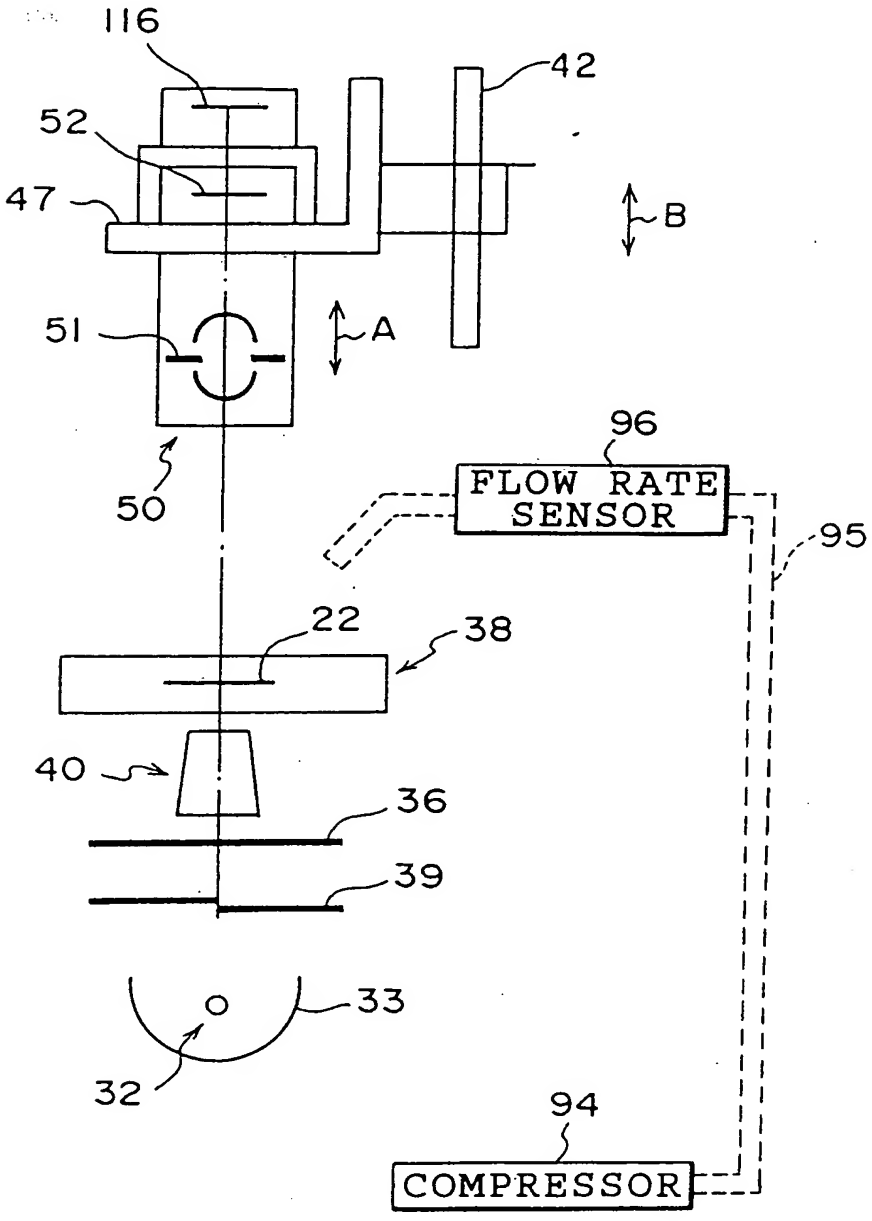

116
42
52
47
B
51
A
96
FLOW RATE SENSOR
50
95
22
38
40
36
39
O
33
32
94
COMPRESSOR

FIG. 7

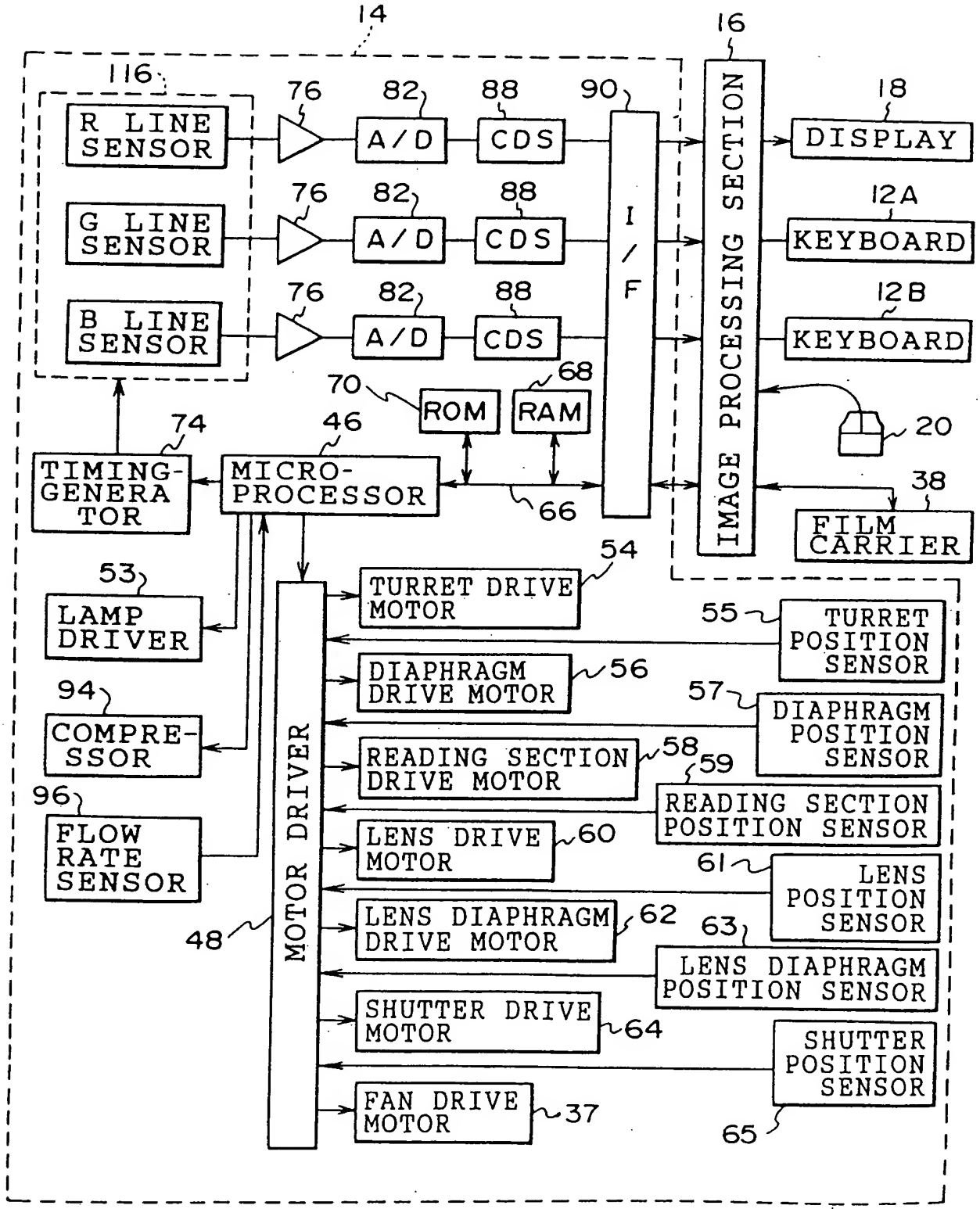

14
16
116
R LINE SENSOR
G LINE SENSOR
B LINE SENSOR
76
82
A/D
88
CDS
90
I/F
IMAGE PROCESSING SECTION
18
DISPLAY
12A
KEYBOARD
12B
KEYBOARD
20
38
FILM CARRIER
70
ROM
68
RAM
74
TIMING-GENERATOR
46
MICRO-PROCESSOR
66
53
LAMP DRIVER
94
COMPRESSOR
96
FLOW RATE SENSOR
48
MOTOR DRIVER
54
TURRET DRIVE MOTOR
55
TURRET POSITION SENSOR
56
DIAPHRAGM DRIVE MOTOR
57
DIAPHRAGM POSITION SENSOR
58
READING SECTION DRIVE MOTOR
59
READING SECTION POSITION SENSOR
60
LENS DRIVE MOTOR
61
LENS POSITION SENSOR
62
LENS DIAPHRAGM DRIVE MOTOR
63
LENS DIAPHRAGM POSITION SENSOR
64
SHUTTER DRIVE MOTOR
SHUTTER POSITION SENSOR
65
37
FAN DRIVE MOTOR

FIG.8

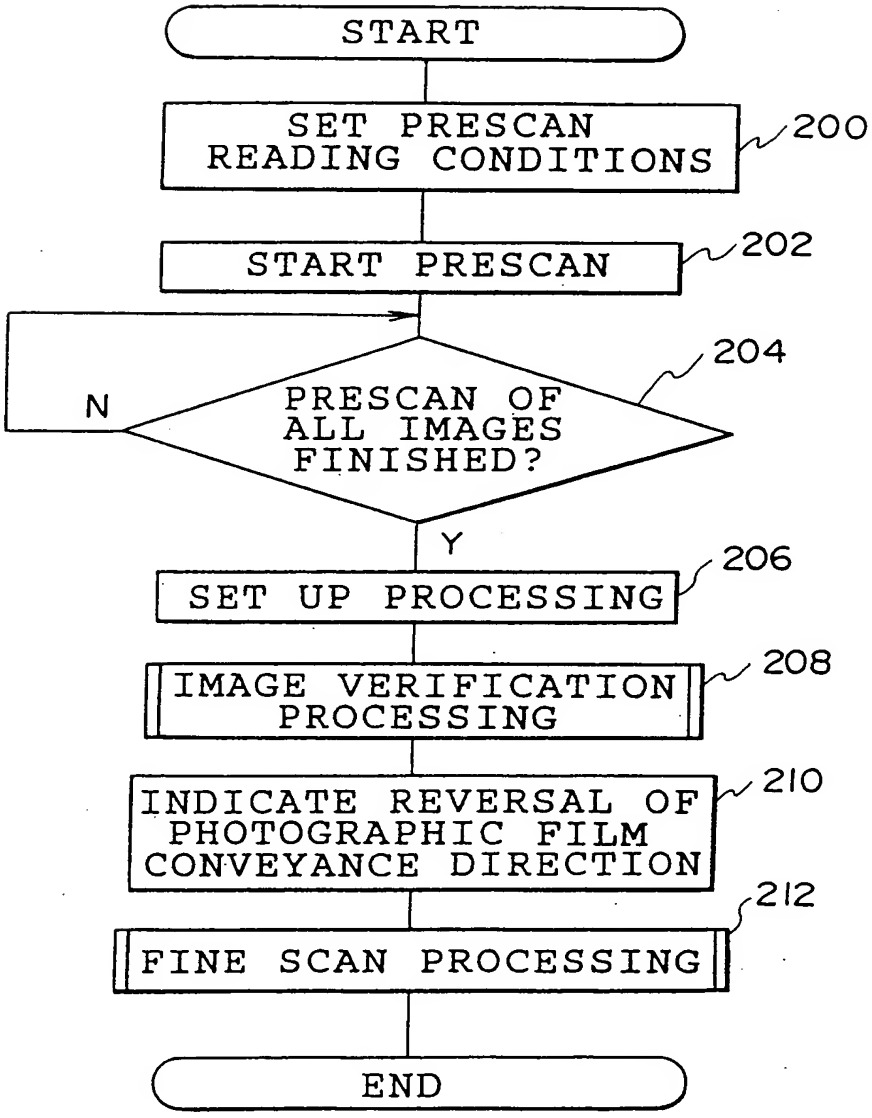

START
SET PRESCAN READING CONDITIONS
200
START PRESCAN
202
PRESCAN OF ALL IMAGES FINISHED?
204
N
Y
SET UP PROCESSING
206
IMAGE VERIFICATION PROCESSING
208
INDICATE REVERSAL OF PHOTOGRAPHIC FILM CONVEYANCE DIRECTION
210
FINE SCAN PROCESSING
212
END

FIG. 9A

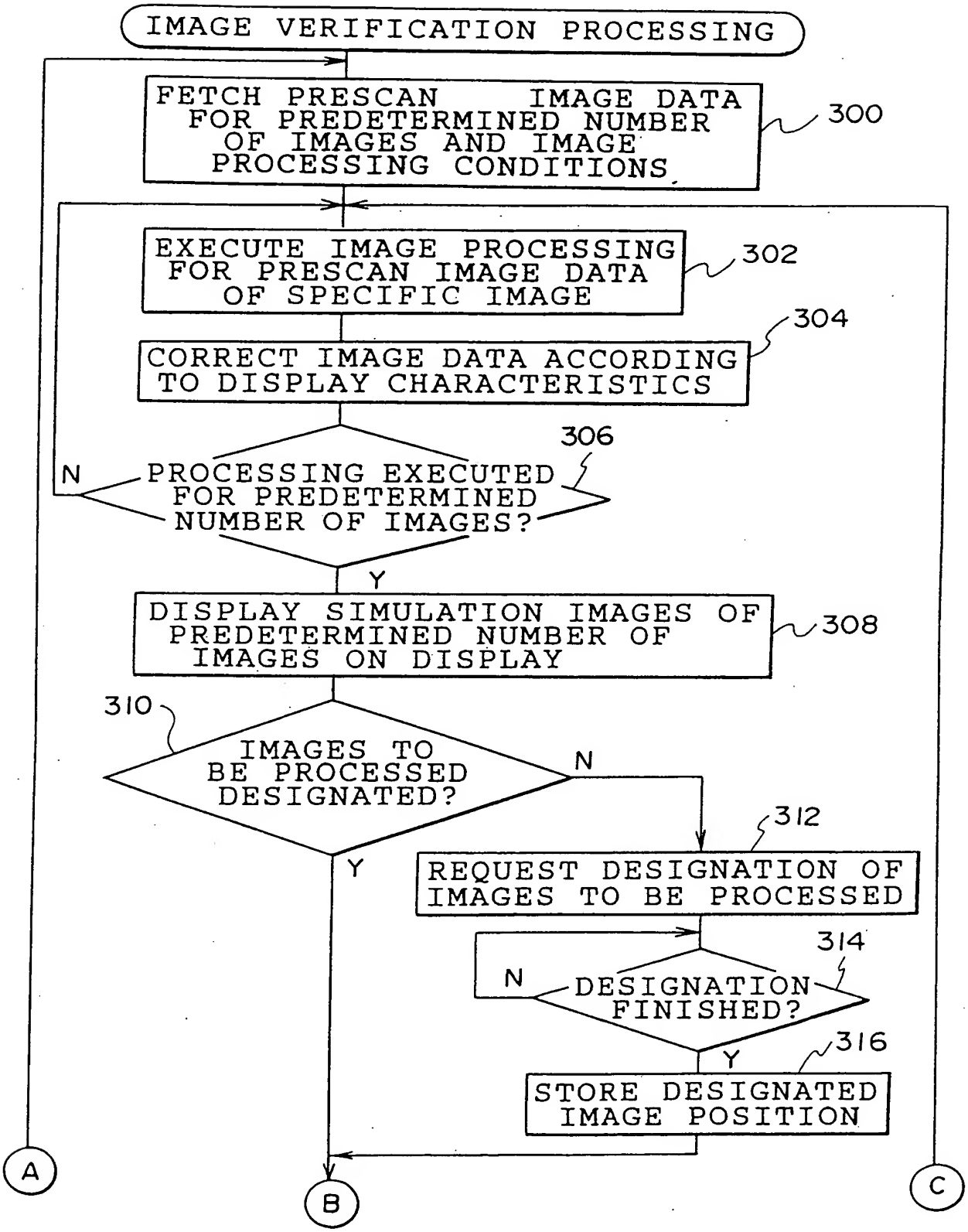


IMAGE VERIFICATION PROCESSING
FETCH PRESCAN IMAGE DATA FOR PREDETERMINED NUMBER OF IMAGES AND IMAGE PROCESSING CONDITIONS
300
EXECUTE IMAGE PROCESSING FOR PRESCAN IMAGE DATA OF SPECIFIC IMAGE
302
CORRECT IMAGE DATA ACCORDING TO DISPLAY CHARACTERISTICS
304
PROCESSING EXECUTED FOR PREDETERMINED NUMBER OF IMAGES?
306
N
Y
DISPLAY SIMULATION IMAGES OF PREDETERMINED NUMBER OF IMAGES ON DISPLAY
308
IMAGES TO BE PROCESSED DESIGNATED?
310
N
Y
REQUEST DESIGNATION OF IMAGES TO BE PROCESSED
312
DESIGNATION FINISHED?
314
N
Y
STORE DESIGNATED IMAGE POSITION
316
A
B
C

FIG. 9B

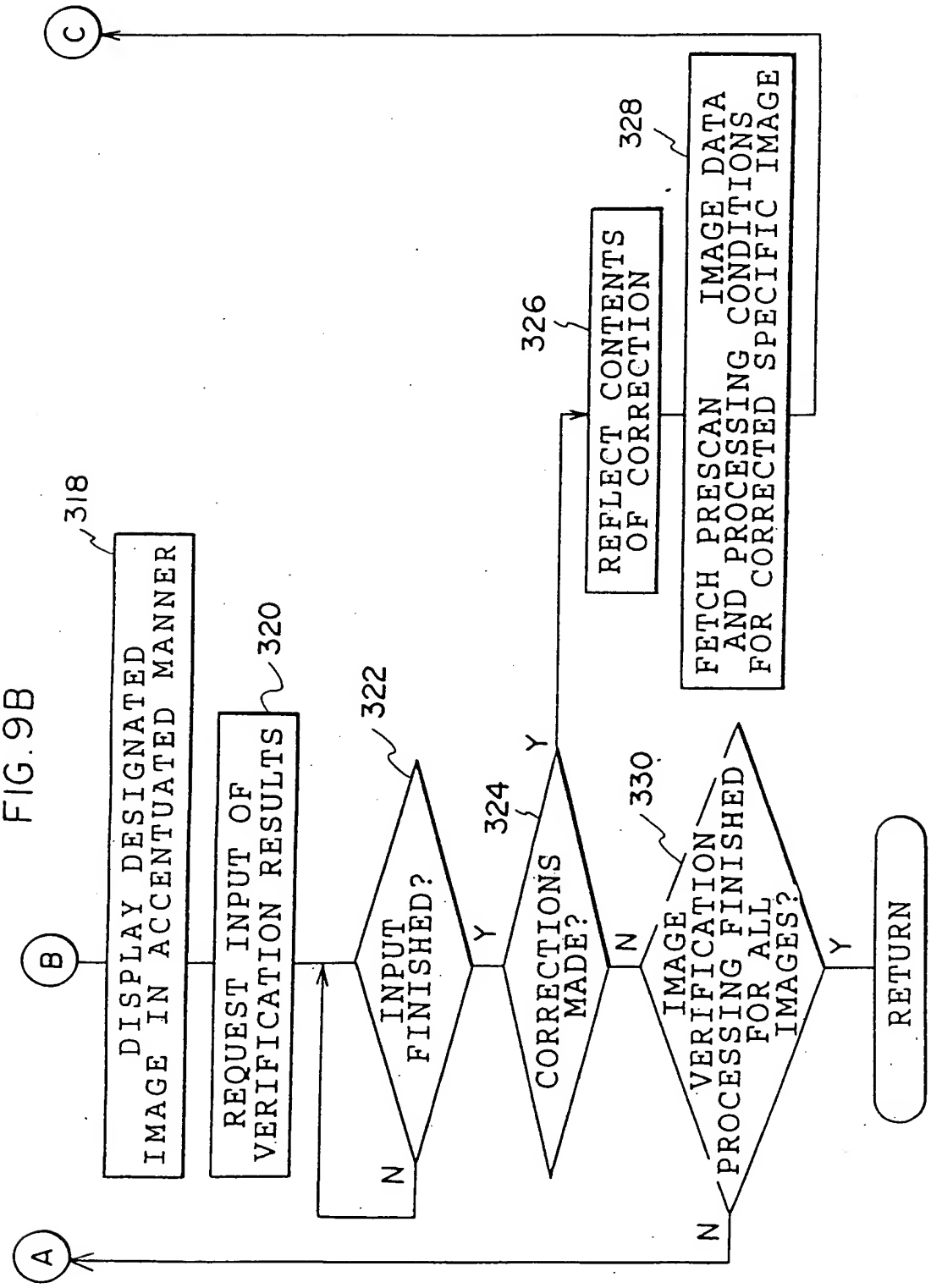

C
318
DISPLAY DESIGNATED IMAGE IN ACCENTUATED MANNER
B
320
REQUEST INPUT OF VERIFICATION RESULTS
322
INPUT FINISHED?
Y
N
324
CORRECTIONS MADE?
Y
326
REFLECT CONTENTS OF CORRECTION
328
FETCH PRESCAN AND PROCESSING CONDITIONS FOR CORRECTED SPECIFIC IMAGE
N
330
IMAGE VERIFICATION PROCESSING FINISHED FOR ALL IMAGES?
Y
RETURN
A

FIG. 10

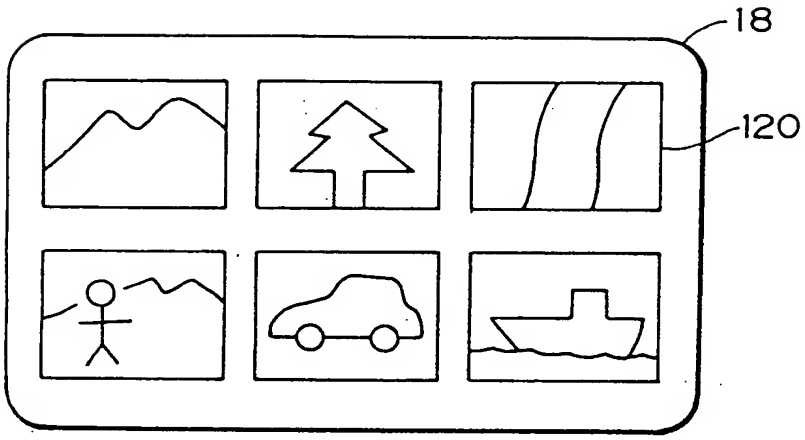


FIG. 11A

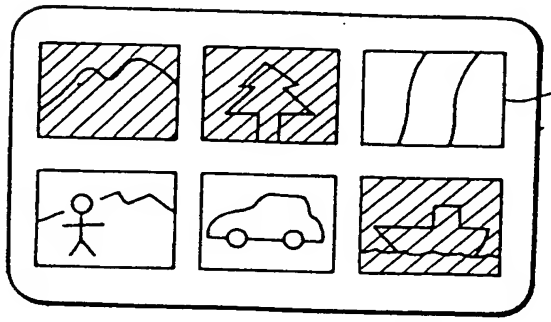


FIG. 11B

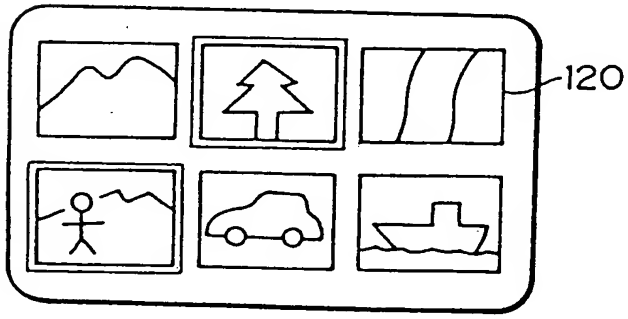


FIG. 11C

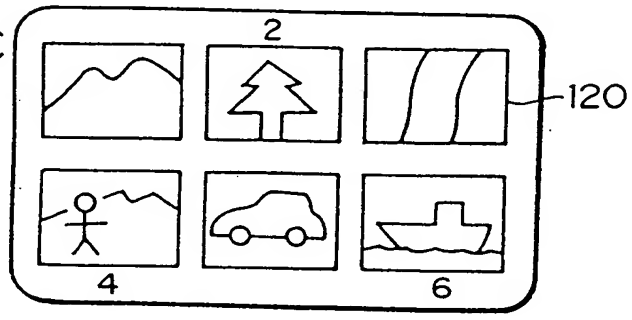


FIG. 11D

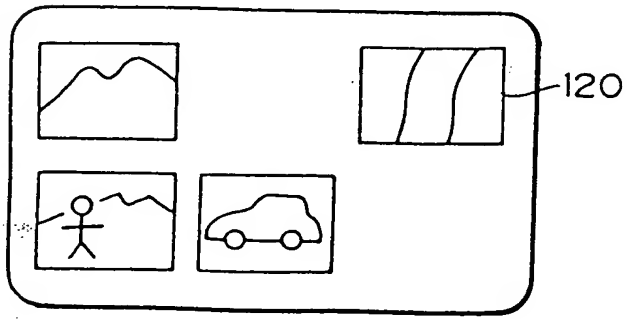


FIG. 12A

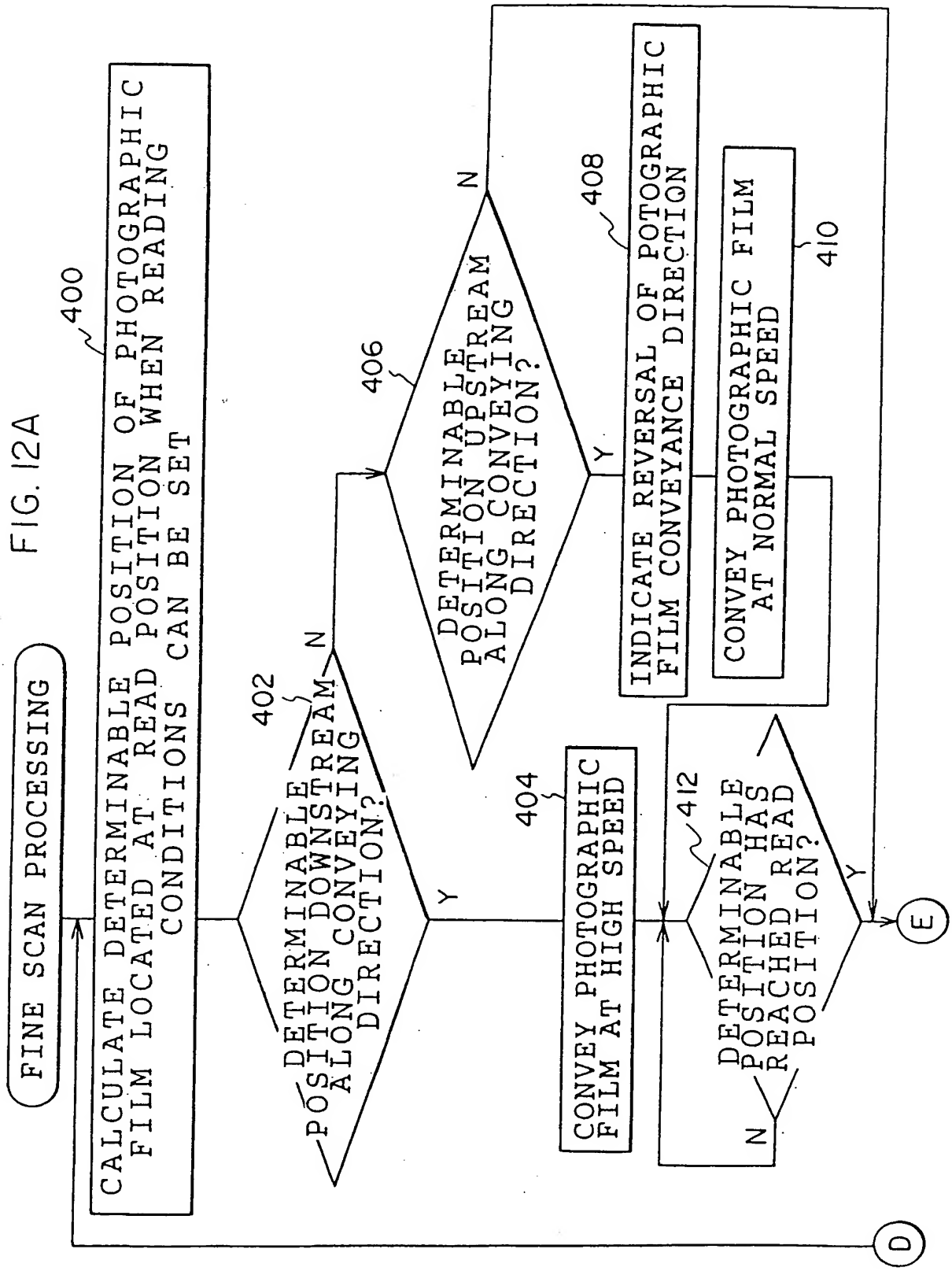
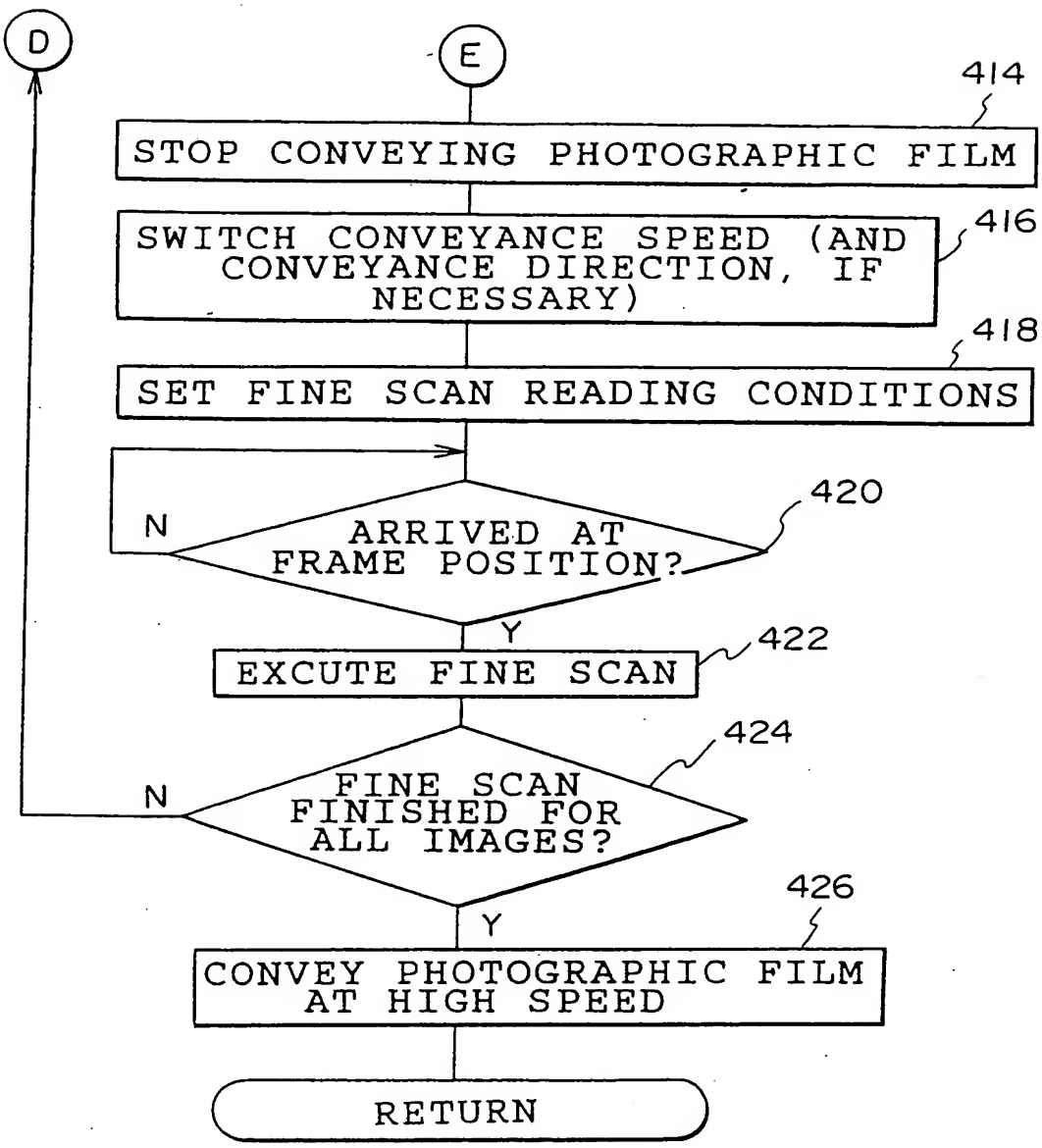

FINE SCAN PROCESSING
400
CALCULATE DETERMINABLE POSITION OF PHOTOGRAPHIC FILM LOCATED AT READ POSITION WHEN READING CONDITIONS CAN BE SET
402
DETERMINABLE POSITION DOWNSTREAM ALONG CONVEYING DIRECTION?
N
Y
404
CONVEY PHOTOGRAPHIC FILM AT HIGH SPEED
406
DETERMINABLE POSITION UPSTREAM ALONG CONVEYING DIRECTION?
N
Y
408
INDICATE REVERSAL OF POTOGRAPHIC FILM CONVEYANCE DIRECTION
410
CONVEY PHOTOGRAPHIC FILM AT NORMAL SPEED
412
DETERMINABLE POSITION HAS REACHED READ POSITION?
N
Y
D
E

FIG. 12B


D
E
414
STOP CONVEYING PHOTOGRAPHIC FILM
SWITCH CONVEYANCE SPEED (AND CONVEYANCE DIRECTION, IF NECESSARY)
416
418
SET FINE SCAN READING CONDITIONS
N
ARRIVED AT FRAME POSITION?
420
Y
EXCUTE FINE SCAN
422
424
N
FINE SCAN FINISHED FOR ALL IMAGES?
Y
426
CONVEY PHOTOGRAPHIC FILM AT HIGH SPEED
RETURN

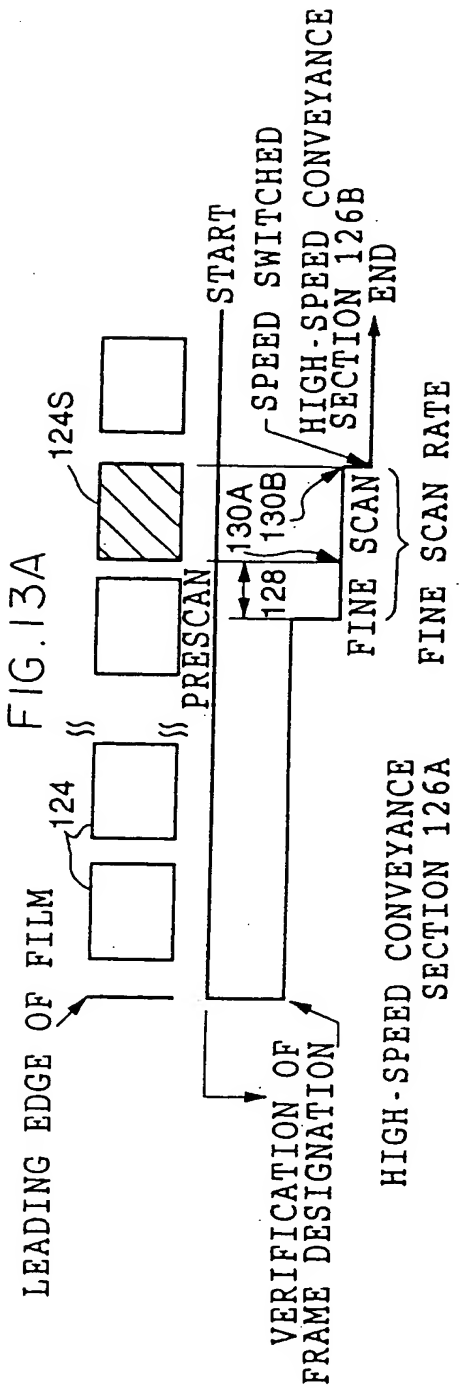


FIG. 13A

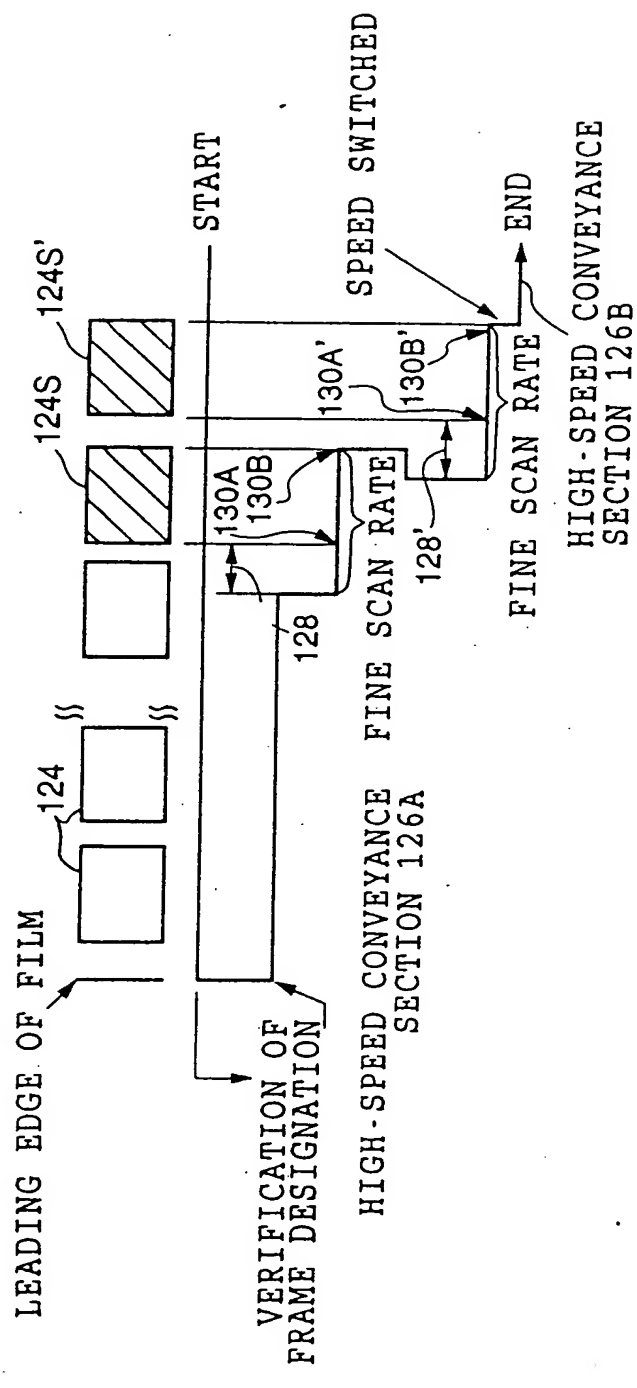


FIG. 13B

FIG. 14

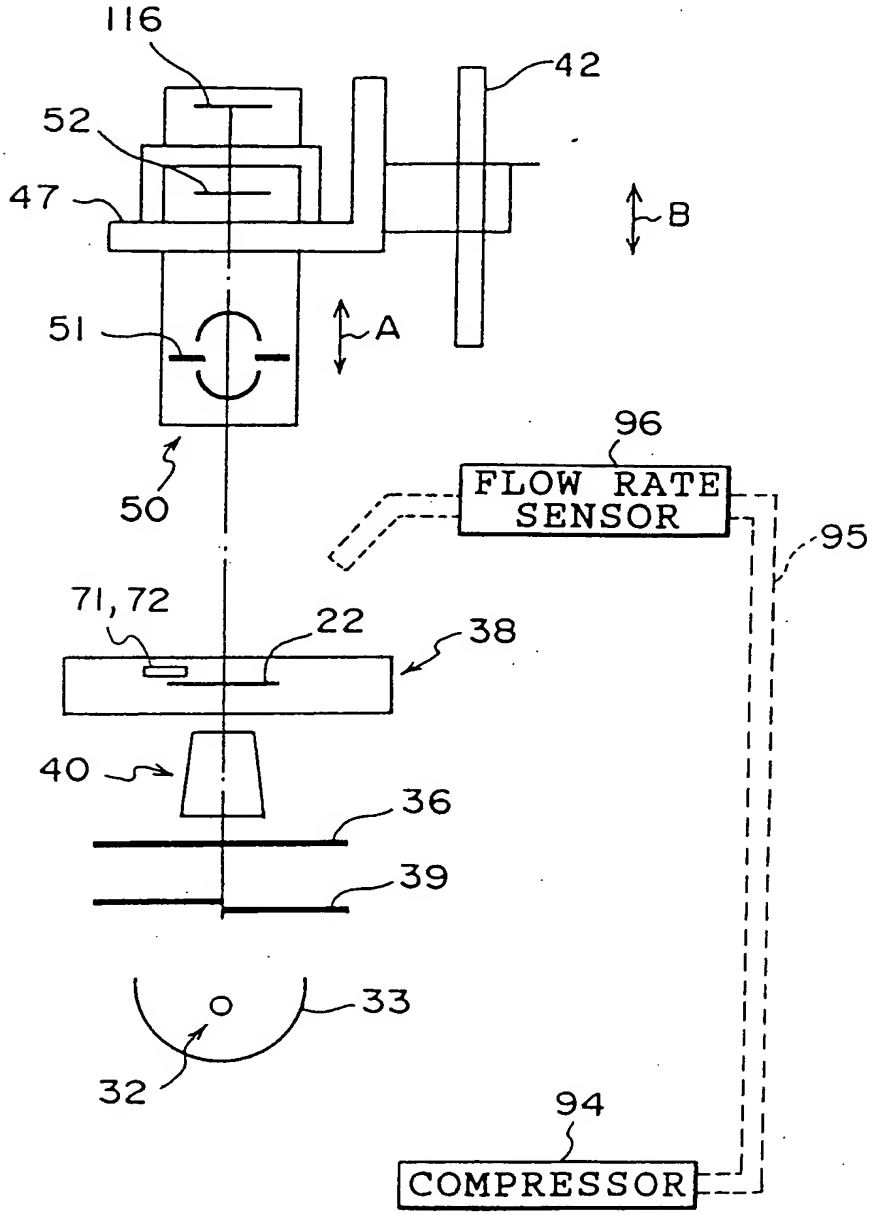

116
42
52
47
B
51
A
96
FLOW RATE SENSOR
95
50
71, 72
22
38
40
36
39
O
33
32
94
COMPRESSOR

FIG. 15

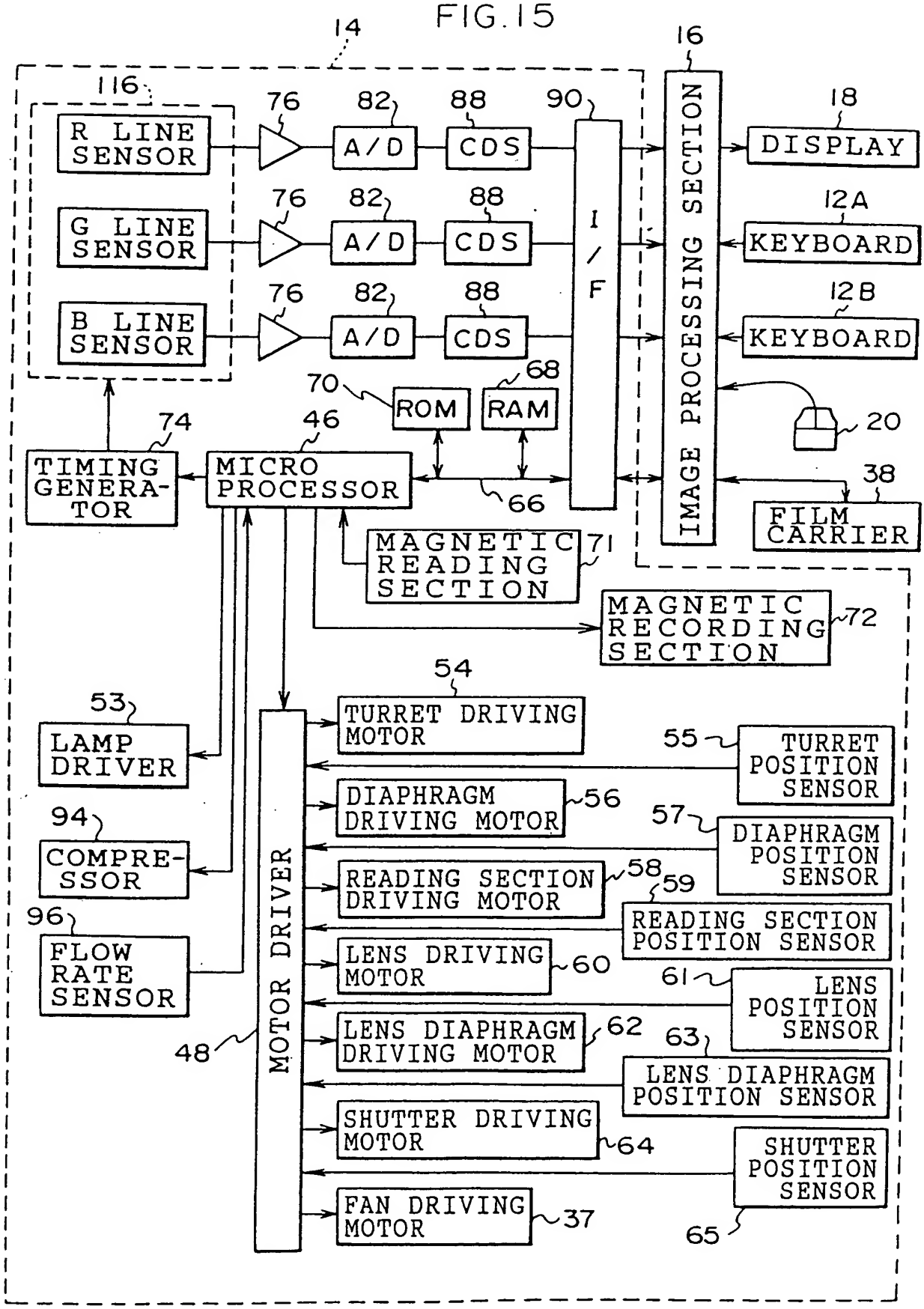

14
16
116
R LINE SENSOR
G LINE SENSOR
B LINE SENSOR
76
82
A/D
88
CDS
90
I/F
IMAGE PROCESSING SECTION
18
DISPLAY
12A
KEYBOARD
12B
KEYBOARD
20
38
FILM CARRIER
70
ROM
68
RAM
74
TIMING GENERATOR
46
MICRO PROCESSOR
66
MAGNETIC READING SECTION
71
MAGNETIC RECORDING SECTION
72
54
TURRET DRIVING MOTOR
55
TURRET POSITION SENSOR
53
LAMP DRIVER
56
DIAPHRAGM DRIVING MOTOR
57
DIAPHRAGM POSITION SENSOR
94
COMPRESSOR
58
READING SECTION DRIVING MOTOR
59
READING SECTION POSITION SENSOR
96
FLOW RATE SENSOR
60
LENS DRIVING MOTOR
61
LENS POSITION SENSOR
48
MOTOR DRIVER
62
LENS DIAPHRAGM DRIVING MOTOR
63
LENS DIAPHRAGM POSITION SENSOR
64
SHUTTER DRIVING MOTOR
SHUTTER POSITION SENSOR
37
FAN DRIVING MOTOR
65

FIG. 16

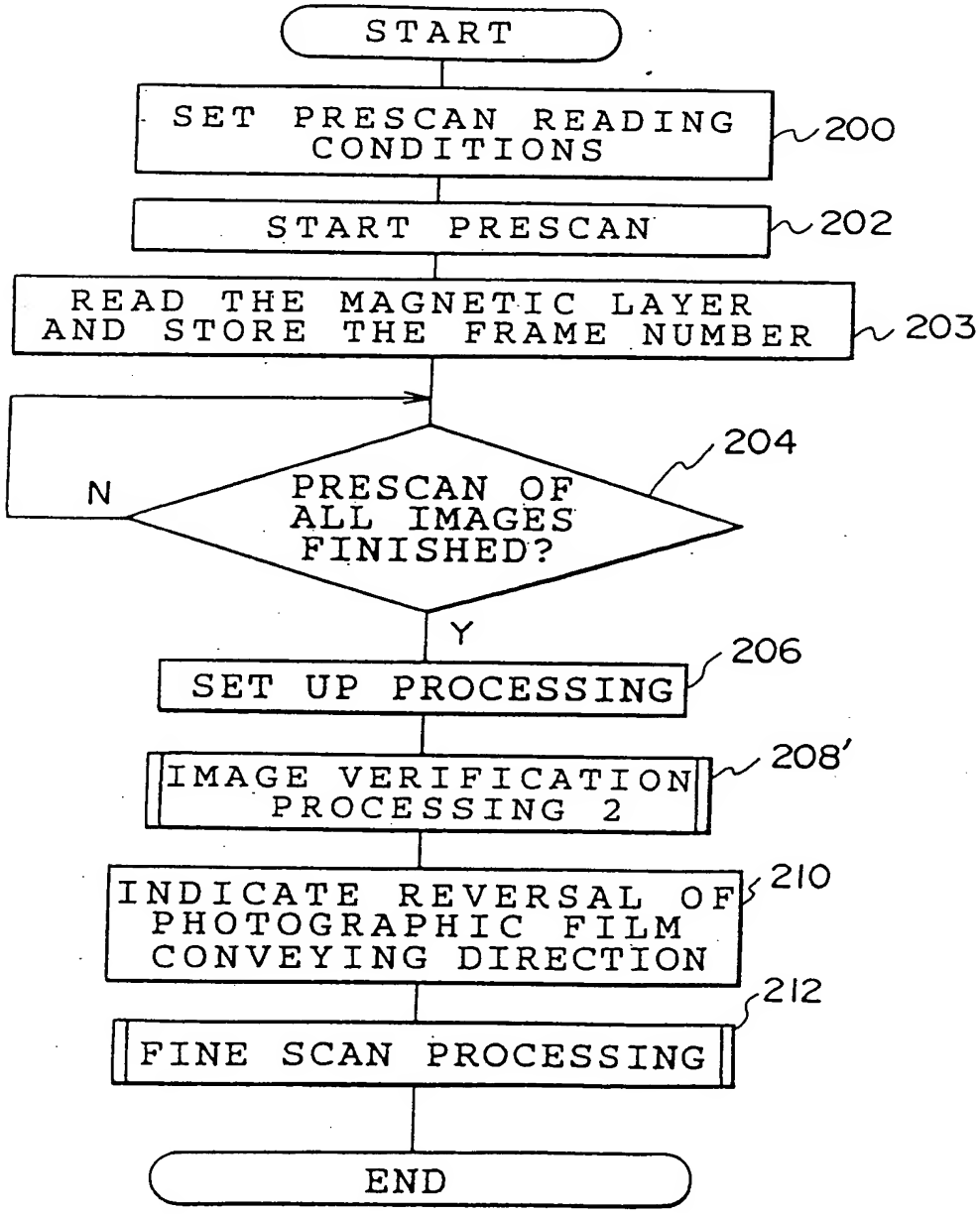

START
SET PRESCAN READING CONDITIONS
200
START PRESCAN
202
READ THE MAGNETIC LAYER AND STORE THE FRAME NUMBER
203
204
N
PRESCAN OF ALL IMAGES FINISHED?
Y
206
SET UP PROCESSING
208'
IMAGE VERIFICATION PROCESSING 2
210
INDICATE REVERSAL OF PHOTOGRAPHIC FILM CONVEYING DIRECTION
212
FINE SCAN PROCESSING
END

FIG. 17A

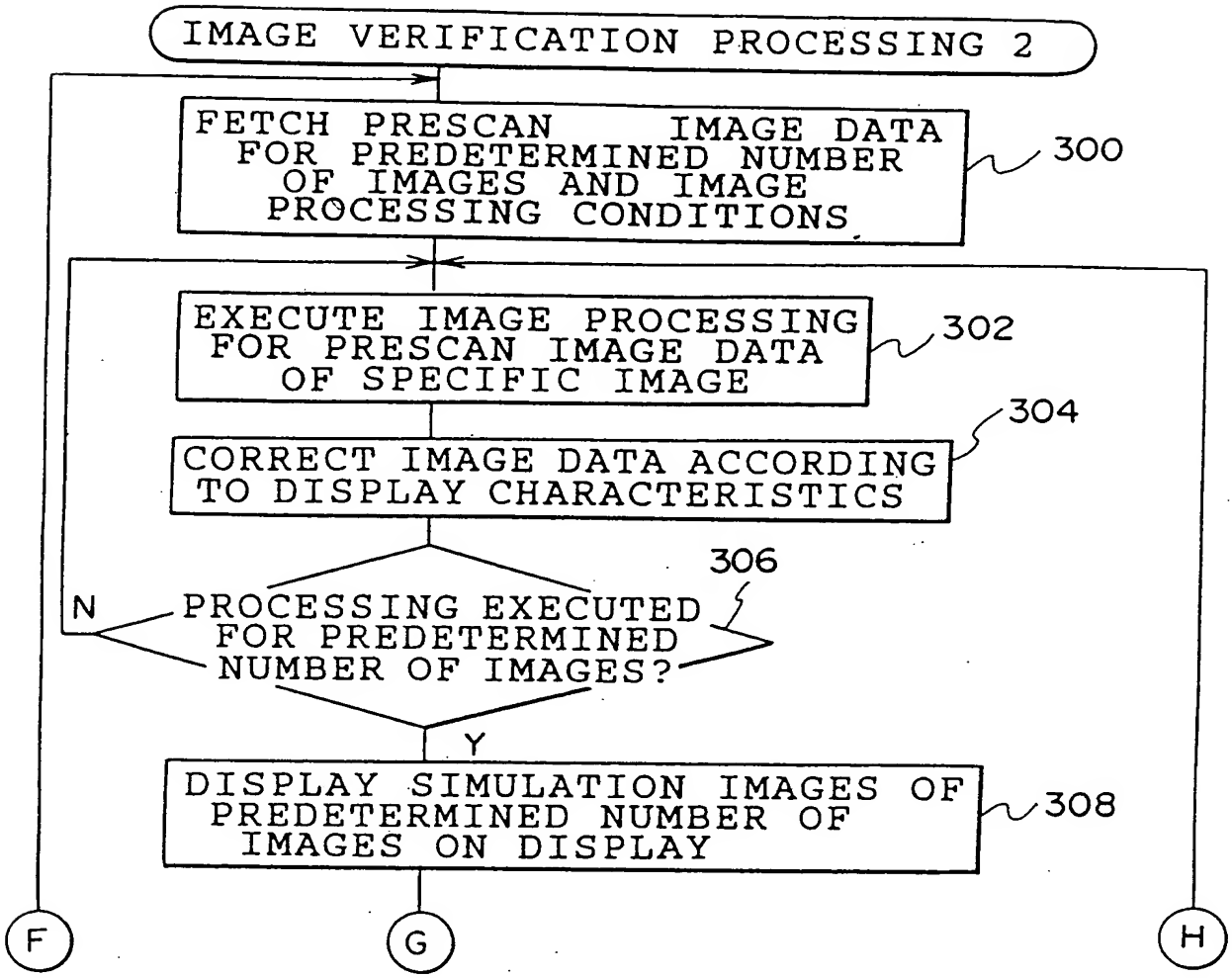


IMAGE VERIFICATION PROCESSING 2
FETCH PRESCAN IMAGE DATA FOR PREDETERMINED NUMBER OF IMAGES AND IMAGE PROCESSING CONDITIONS
300
EXECUTE IMAGE PROCESSING FOR PRESCAN IMAGE DATA OF SPECIFIC IMAGE
302
CORRECT IMAGE DATA ACCORDING TO DISPLAY CHARACTERISTICS
304
PROCESSING EXECUTED FOR PREDETERMINED NUMBER OF IMAGES?
306
N
Y
DISPLAY SIMULATION IMAGES OF PREDETERMINED NUMBER OF IMAGES ON DISPLAY
308
F
G
H

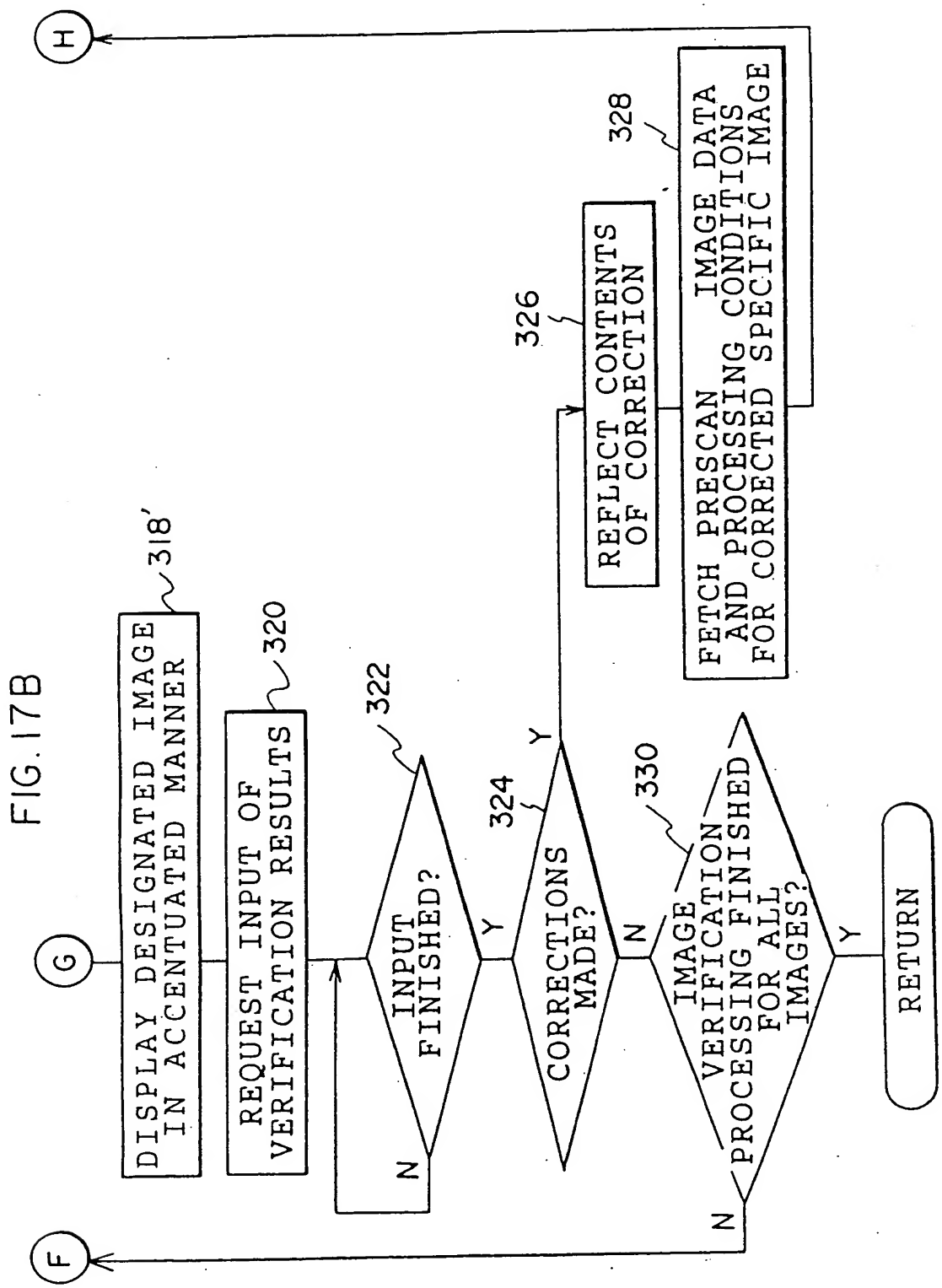

H
G
F
DISPLAY DESIGNATED IMAGE IN ACCENTUATED MANNER
318'
REQUEST INPUT OF VERIFICATION RESULTS
320
INPUT FINISHED?
322
Y
N
CORRECTIONS MADE?
324
Y
N
REFLECT CONTENTS OF CORRECTION
326
FETCH PRESCAN IMAGE DATA AND PROCESSING CONDITIONS FOR CORRECTED SPECIFIC IMAGE
328
IMAGE VERIFICATION PROCESSING FINISHED FOR ALL IMAGES?
330
Y
N
RETURN

FIG. 17B

FIG. 18

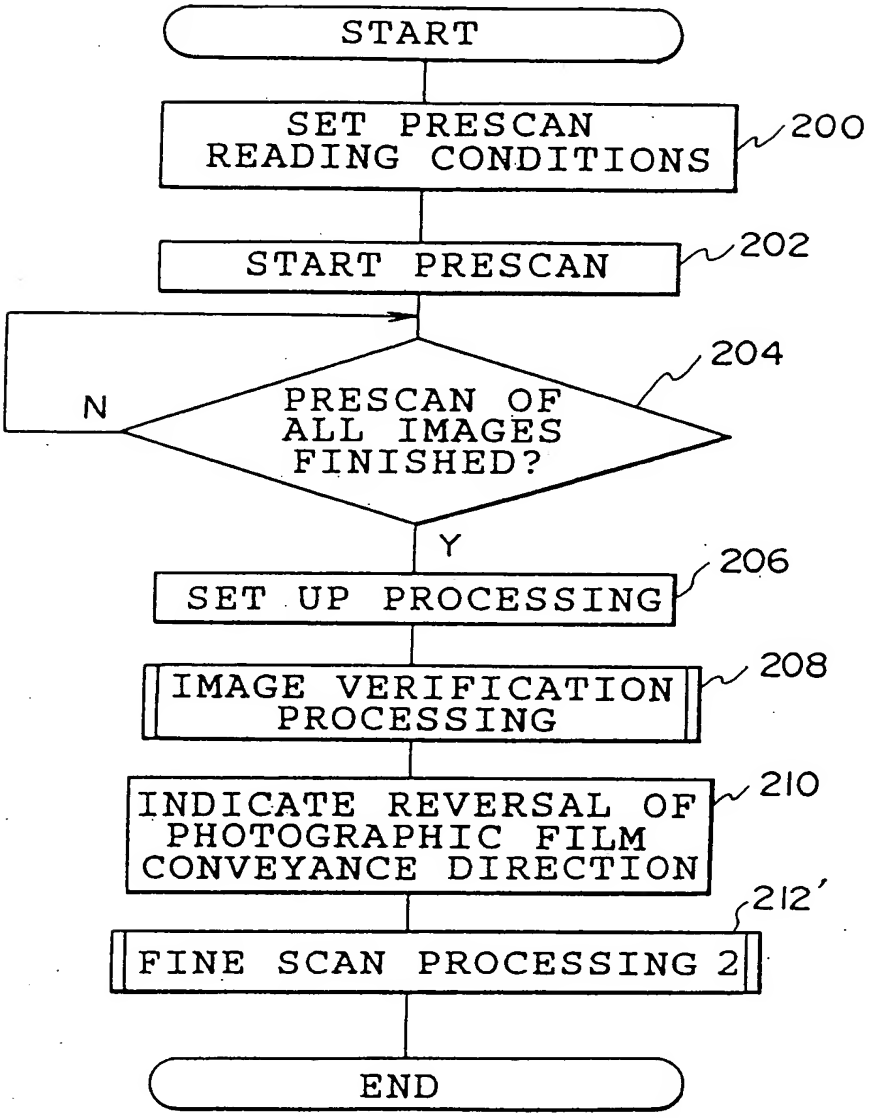

START
SET PRESCAN READING CONDITIONS
200
START PRESCAN
202
PRESCAN OF ALL IMAGES FINISHED?
204
N
Y
SET UP PROCESSING
206
IMAGE VERIFICATION PROCESSING
208
INDICATE REVERSAL OF PHOTOGRAPHIC FILM CONVEYANCE DIRECTION
210
FINE SCAN PROCESSING 2
212'
END

FIG.19A

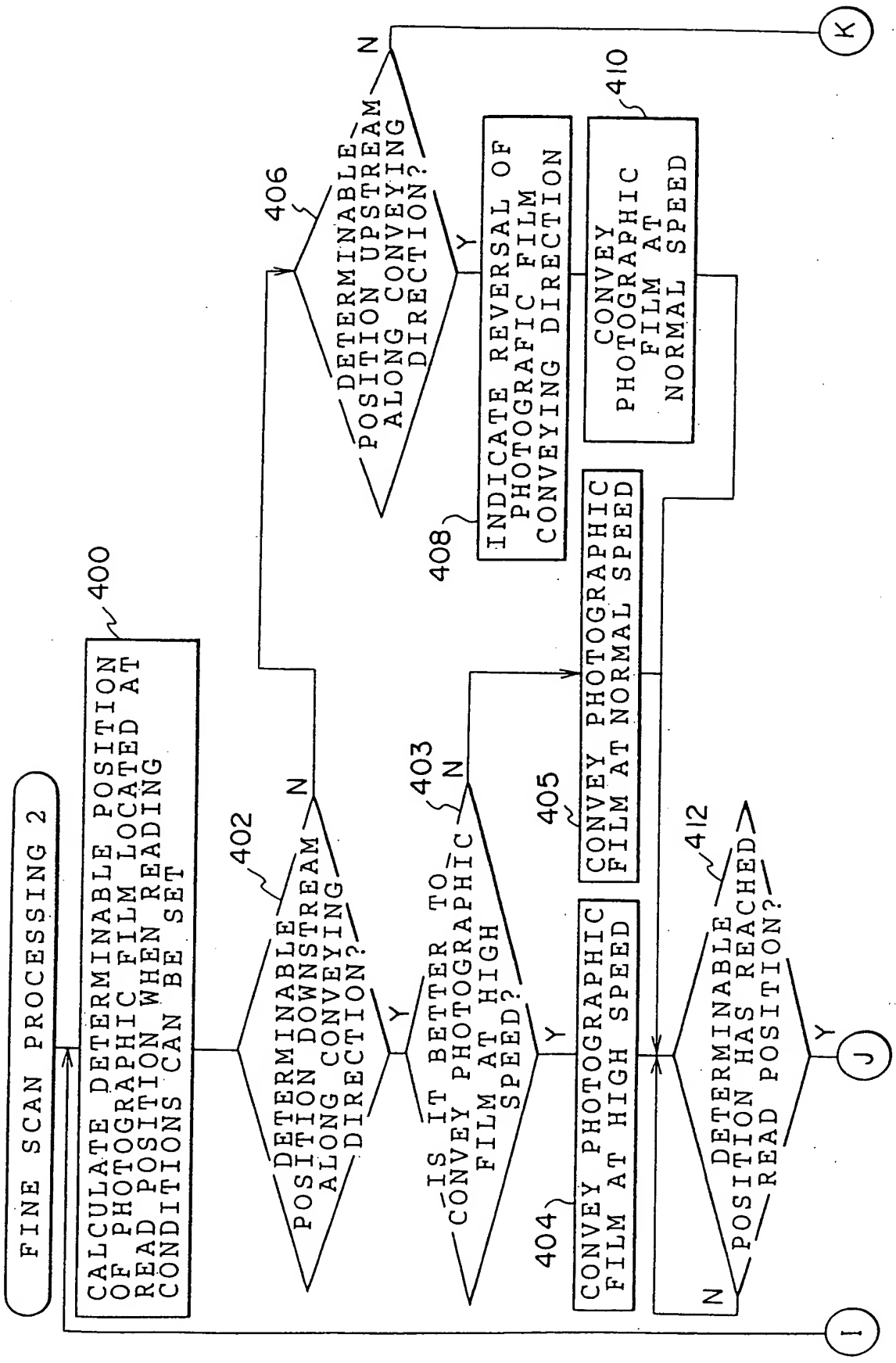

FINE SCAN PROCESSING 2
400
CALCULATE DETERMINABLE POSITION OF PHOTOGRAPHIC FILM LOCATED AT READ POSITION WHEN READING CONDITIONS CAN BE SET
402
DETERMINABLE POSITION DOWNSTREAM ALONG CONVEYING DIRECTION?
N
Y
403
IS IT BETTER TO CONVEY PHOTOGRAPHIC FILM AT HIGH SPEED?
N
Y
404
CONVEY PHOTOGRAPHIC FILM AT HIGH SPEED
405
CONVEY PHOTOGRAPHIC FILM AT NORMAL SPEED
406
DETERMINABLE POSITION UPSTREAM ALONG CONVEYING DIRECTION?
N
Y
408
INDICATE REVERSAL OF PHOTOGRAFIC FILM CONVEYING DIRECTION
410
CONVEY PHOTOGRAPHIC FILM AT NORMAL SPEED
412
DETERMINABLE POSITION HAS REACHED READ POSITION?
N
Y
I
J
K

FIG. 19B

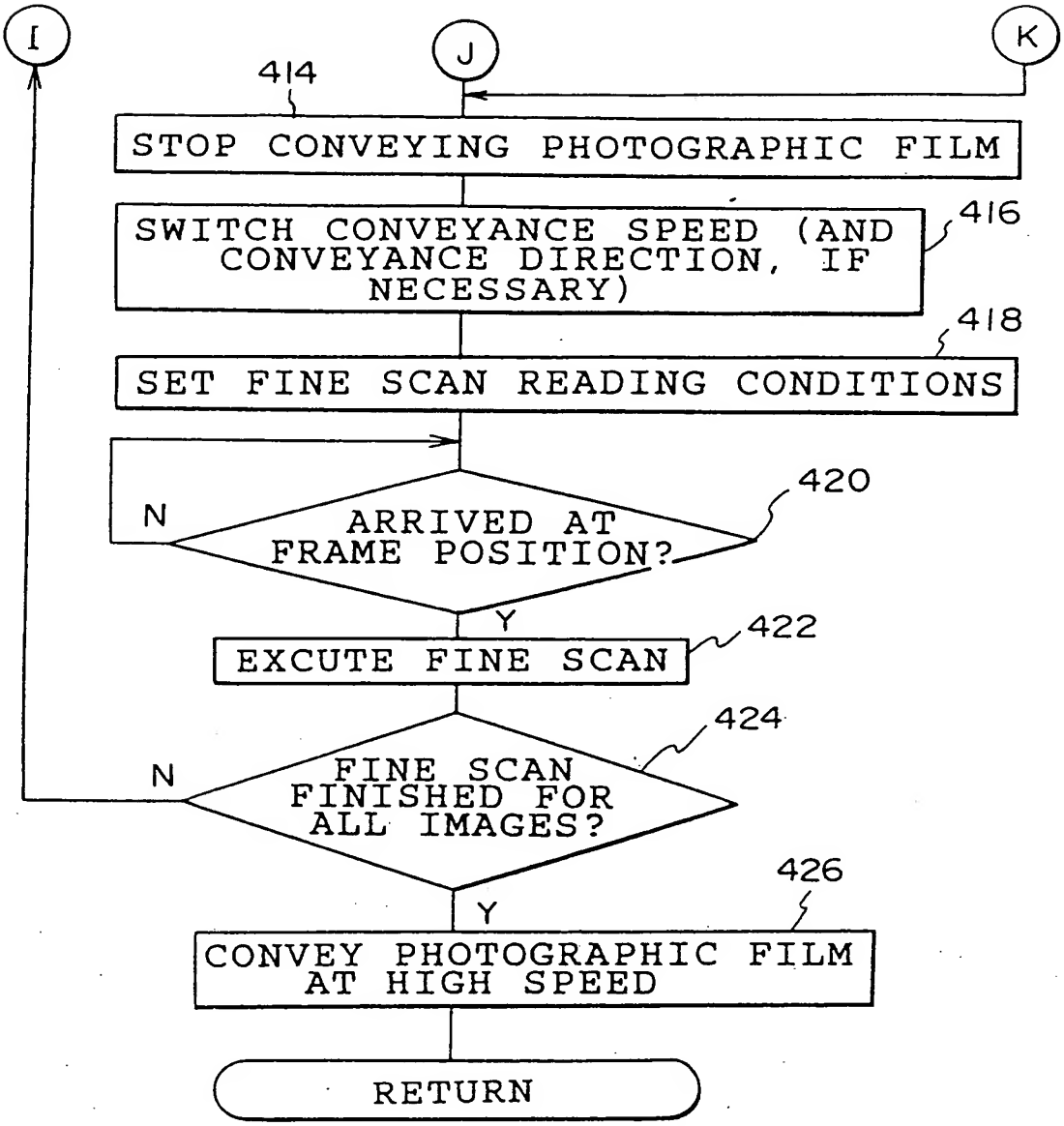

I
J
K
414
STOP CONVEYING PHOTOGRAPHIC FILM
SWITCH CONVEYANCE SPEED (AND CONVEYANCE DIRECTION, IF NECESSARY)
416
418
SET FINE SCAN READING CONDITIONS
N
ARRIVED AT FRAME POSITION?
420
Y
EXCUTE FINE SCAN
422
424
N
FINE SCAN FINISHED FOR ALL IMAGES?
426
Y
CONVEY PHOTOGRAPHIC FILM AT HIGH SPEED
RETURN

FIG. 20

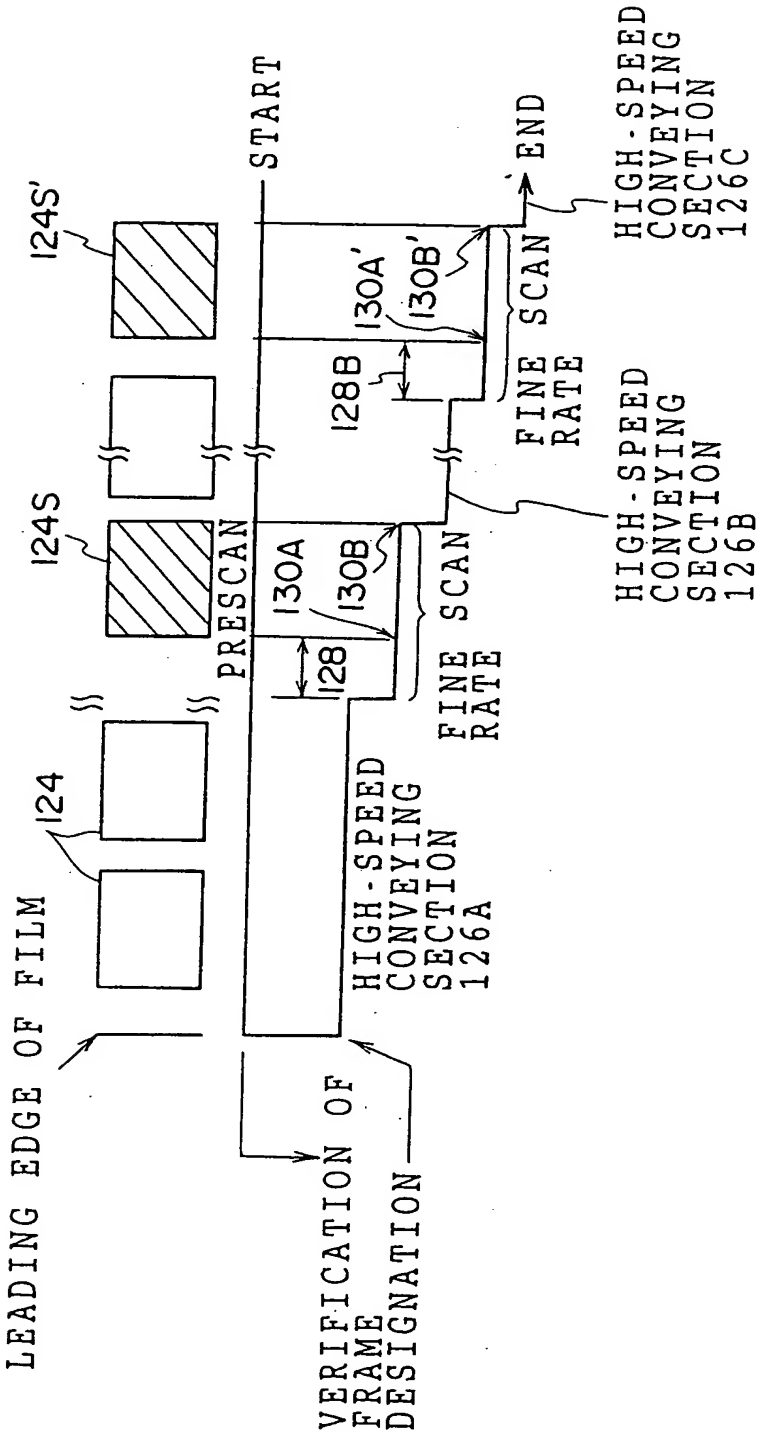

LEADING EDGE OF FILM
124
124S
124S'
START
PRESCAN
128
130A
130B
FINE SCAN
RATE
HIGH-SPEED
CONVEYING
SECTION
126A
VERIFICATION OF
FRAME
DESIGNATION
128B
130A'
130B'
FINE SCAN
RATE
END
HIGH-SPEED
CONVEYING
SECTION
126B
HIGH-SPEED
CONVEYING
SECTION
126C

FIG. 21

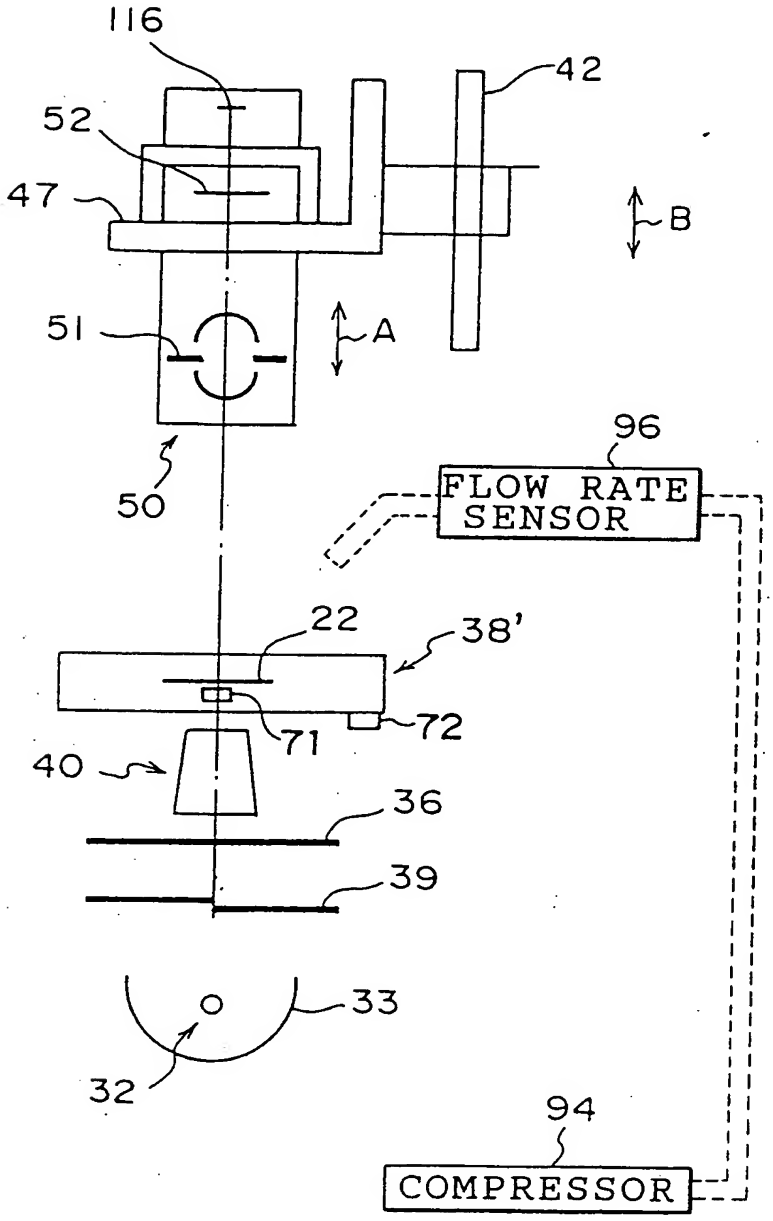
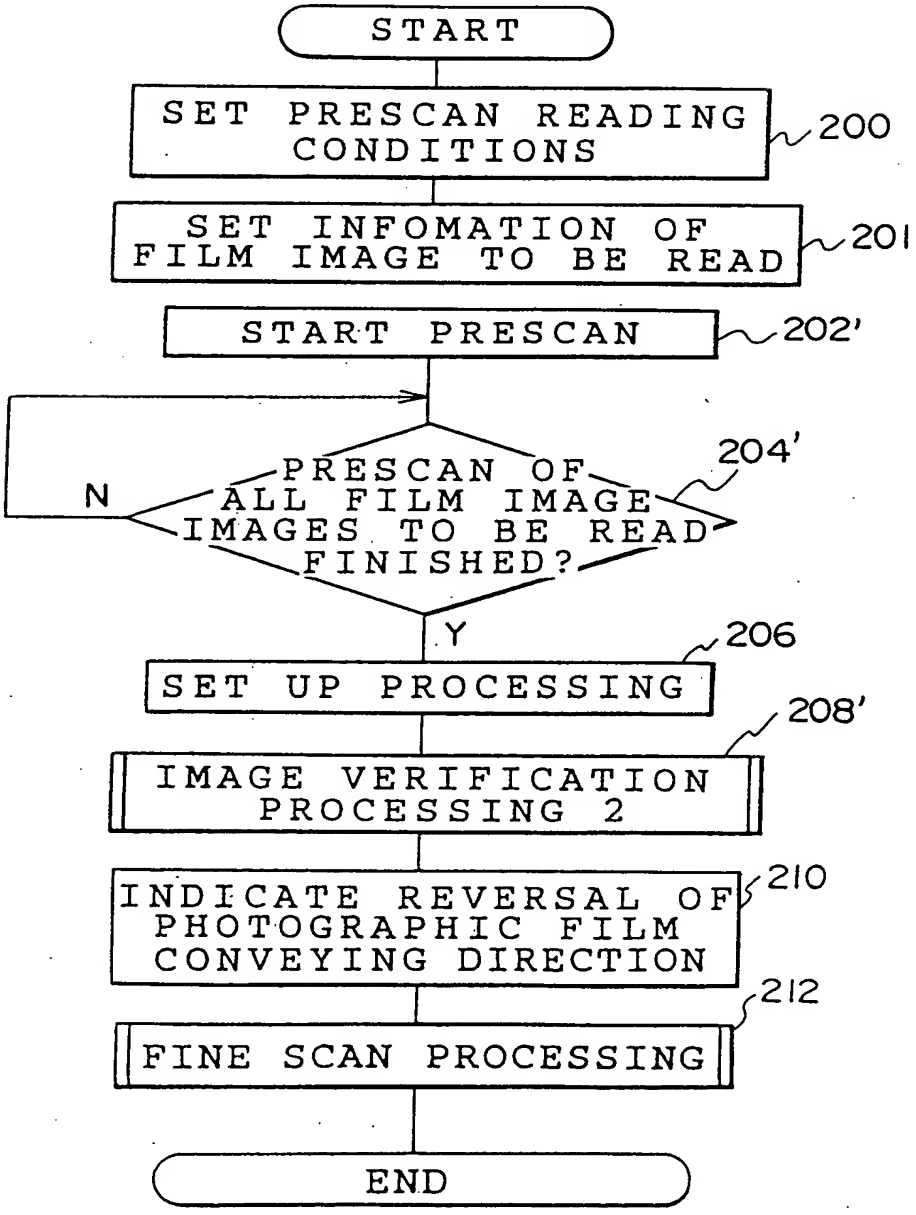

116
42
52
47
B
51
A
96
FLOW RATE SENSOR
50
22
38'
71
72
40
36
39
O
33
32
94
COMPRESSOR

FIG. 22


START
SET PRESCAN READING CONDITIONS
200
SET INFOMATION OF FILM IMAGE TO BE READ
201
START PRESCAN
202'
PRESCAN OF ALL FILM IMAGE IMAGES TO BE READ FINISHED?
204'
N
Y
SET UP PROCESSING
206
IMAGE VERIFICATION PROCESSING 2
208'
INDICATE REVERSAL OF PHOTOGRAPHIC FILM CONVEYING DIRECTION
210
FINE SCAN PROCESSING
212
END

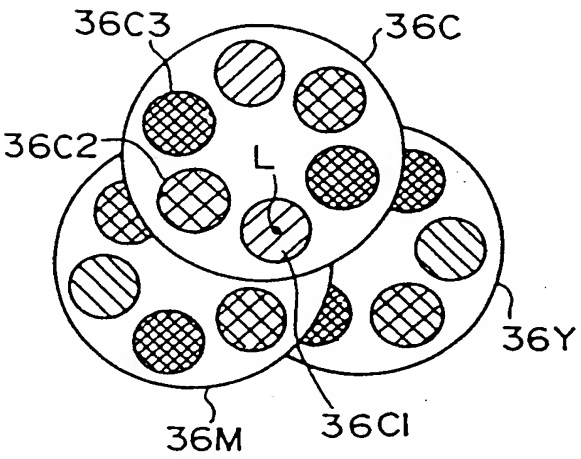



FIG. 23